An Experimental Investigation of Factors Affecting Consumers' Reactions to Mobile APP-Based Promotions

Shu-Lu Hsu, Jeffrey C. F. Tai, and Yi-Han Wang

Abstract—The purpose of this study is to understand how consumers react to a company's promotional offers with mobile applications (APP) as premiums. This paper presents the results of an experimental study where five features of APP were involved: the cost (free/discounted) for earning APP, the relationship between APP and the promoted product, the perceived usefulness, the perceived ease of use, and the perceived playfulness of APP in the context of light foods purchase. The results support that the above features, except perceived ease of use, have substantial influences on consumers' intention to adopt the APP. Among the five features, the cost for earning APP has the most impact on the adopting intention of APP. The study also found a positive influence of adopting intention of APP on the consumer's purchase intention of the promoted product. Thus, APP-based premiums may enhance the consumer's purchase intention of a company's promoted products.

Keywords—Mobile Application, Premium, Sales Promotion, TAM.

I. INTRODUCTION

RAPID developments in mobile devices and wireless networking technology have changed the nature of digital contents and provided a handy accessibility to consumers. The advantages of technology developments allow people to conduct their business, to enjoy entertainments, and to update the latest information anywhere at any time [1]. A mobile application (APP), which refers to a software application that runs in smart phones or other mobile devices, plays an integral role in mobile services lately [2]. The demand for mobile APPs is expected to continue growing, with the number of global downloads anticipated to reach 76.9 billion in 2014, with a value of $35 billion [3]. The popularity of mobile APPs indicates that APPs provide value beyond that provided by the mobile device itself and they have become an important issue for the use of mobile devices.

Every company must promote its products and services in order to generate awareness about them in the market and increase sales. Since customer is always equipped with mobile devices, marketers consider them as one of the best tools for reaching out to the existing and potential target audience to learn about a company's products and services. Sales promotion comprises a multitude of marketing tools designed to stimulate the purchase of goods and service. Among those tools, premiums occupy an important place. A premium-based sales promotion is one in which a good or service is offered free of charge or at a relatively low price in return for the purchase of one or many products or services [4]. Now Promotion is often conducted through mobile devices as opposed to the traditional tools of newspapers, electronic media, graffiti, pamphlets, etc. The mobile is quickly becoming the go-to way a growing segment of consumers interact with brands, and APPs are rapidly becoming the dominant avenue for this interaction. APPs could work as an effective mean of business promotion for which enable organizations to immediately meet the unique needs of customers and offer them quality services. Many companies have endeavored to develop distinctive APPs which result in market penetration and help significantly in the process of generating awareness, shaping users attitude towards the brand, boosting intent to buy or avail the product/service offered. For instance, Coca Cola Zero made a freemium model APP which generated a delivery mechanism to speed up the purchasing process and supported the existing promotion campaigns [5]. Starbucks, the coffee distribution chain, has begun giving out a free APP to its customers as part premium of its "Pick of the Week" promotion. That is, Starbucks customers have the chance to get a free iOS APP through a promocode displayed in the stores [6]. While prior research has provided useful insights into premium promotion, e.g. [7]-[9], the understanding of APPs working as promotion premiums as well as strategy formulation remains deficient. In addition, despite of the substantially actual usage of mobile APPs in market and more and more companies begin to leverage APPs as prominent promotion tools, factors influencing consumers' adoption of APP-based premiums are indistinct in the academic research. This study is therefore aimed to investigate the effect of APPs as premiums for promoting company's specific products/services, the factors affecting consumer's intention to adopt the APP, and to analyze the relationships among these factors.

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II. CONCEPTUAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

A. Premium Promotion

A premium is a product or a service offered free or at a relatively low price in return for the purchase of one or many products or services [10]. Free gifts or premium promotions - terms often used interchangeably - segregate the promotional benefit in the form of a separate product or service that may either be complementary or not to the brand and/or product under promotion. Price promotions might undermine quality perceptions, in contrast, premium promotion is effective in maintaining quality perceptions because consumers make quality inferences based on the original price rather than the price corrected for the value of the free gift [11]. This implies that framing an offer as a separate premium is a good tool to communicate value to customers. The reasoning that it is better to frame an offer as a separate premium is supported by [12]. The segregation of gains' principle from mental accounting theory, argues that "a promotion that segregates the promotional benefit from the original product is preferred to a promotion that integrates the promotional benefit with the original product".

Marketers frequently use premiums with the aim of increasing brand share and enhancing firms' profitability [13]. Premiums are seen to: (1) build brand image, drive traffic and increase sales [14], [15], (2) move excess stock [14], (3) be an effective branding tool [16], (4) build emotional and rational involvement [14], and (5) be effective in developing an image of high quality [14]. However, there is few empirically research available on the effects of premiums as a sales promotion tool. Although there are various forms of premium-based promotion in marketing literatures, free or at a lower price was agreed as the basic features of premiums. The efficacy of free premiums is, however, in doubt, with detractors claiming that giveaways take away from future sales, and defenders arguing that they increase them [17]. Reference [18] proposed that although a free product enhances the transactional value of the purchase, it may bring a mixed bag of inferences that consumers may draw on the basis of the offer. He further indicated that if consumers make this type of inference, a free offer should lead consumers to lower their reservation prices for a product offered as a free gift as compared to when it has not been offered as a free. However, in general, the value of the transaction with a premium offered free should be thought higher than that offered with discounted price. Reference [19] investigated that if two sales promotions have the same monetary value, the promotion which is framed by the consumer as a gain will "feel" more valuable than that framed as a reduced loss. It is our intuition that consumers are more likely to perceive the nickel as a gain than they would to perceive a promotion offering 5 cents off the regular purchase price. Based on Diamond and Sanyal's viewpoint, [20] proposed that a free premium which will be viewed by the consumer as a gain and will feel more valuable than a self-liquidation premium promotion. Based on social exchange theory, [21] discussed the issues of premium and believed that the more is demanded in return for a premium, the less is its value of and potential for consumers' purchase or brand loyalty. To sum up, it appears that the higher the value of a premium the greater the tendency the consumer to reciprocate. Thus, when an APP is used as a promotion premium, we believe that the reciprocating intention for free download will be higher than that for download at a discounted price. Thus, it is expected:

H1. When a mobile APP is offered with purchasing a specific product, users are more prone to adopt the APP in response to free download than download at a discounted price.

The promoted product with premium can be viewed as bundling, a sale of two or more separate products in a package [22], which is pervasive in today's market. Reference [23] proposed that bundling can be used as a short term promotional strategy to stimulate purchase. Firms often bundle a new product with an existing one aiming at raising awareness of the new product while simultaneously increasing sales of their existing products. Bundle composition refers to the usage characteristics of the two products within a bundle. Difference in composition within a bundle will affect purchase intention differently [23]. Reference [24] defined complementary bundling as a selling strategy whereby two or more products which are functionally related are sold at one combined price. He indicated that in complementary bundles, the consumer is in effect purchasing a system of products which enable and enhance the functions of each other. Reference [25] identified various complementary relationships existing between products and proposed a framework for its classification. Reference [8] believed that complementary products in a bundle certainly foster sales. That is, a complementary product bundle is superior to an unrelated product bundle because it provides value added to customers. This value added may raise customers' reservation price for the bundle. Thus, customers are willing to pay more for the related products bundle [7], [22]. Based on the above opinions, it is expected that:

H2. The degree of the mobile APP-product relationship (RL) positively influences the user's intention to adopt the APP (IA).

Reference [26] found that for products with unattractive premium promotions consumer preference decreases because consumers think they are paying extra for premiums they do not want. The result explains why the attraction of premium influences the consumer purchase decision. Similarly, [9] investigated consumer reactions to premium-based promotional offers. They presented that the consumer's appreciation of premium-based promotional offers is increasing with his/her interest in the premium. Based on the previous studies, it is expected that the purchase intention for a premium-based sales promotion is positively affected by the consumer's interest in the premium. Thus, it is expected that:

H3. When a mobile APP offered with purchasing a specific product, the purchase intention of the product (IP) is

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positively influenced by the user's intention to adopt the APP (IA).

B. Technology Acceptance Model

The Technology Acceptance Model was first proposed by Davis in 1989 based on the theory of reasonable action (TRA) and the theory of planned behavior (TPB). TAM is intended to provide a theoretic foundation and parsimony, to explain and predict the acceptance and use intentions of information technology users. References [27] and [28] presented two factors that determine user's acceptance or rejection of information technology, namely perceived usefulness and perceived ease of use. Users who perceive higher ease of use of a information technology think it is easier to use, generating a positive attitude towards adopting the technology. If the perceived ease of use is low, then user attitude is negative. Moreover, perceived ease of use can strengthen perceived usefulness, while attitude and perceived usefulness have significantly positive effects on adoption intention. This model has been validated through examining various types of information technologies pertinent to individual and organization adoption (see Horton et al. [29] for a review of literature).

Recently TAM has been used to predict mobile commerce (MC) adoption. Reference [30] adopted TAM to investigate factors affecting Singaporeans' attitudes towards MC and the results supported the arguments of TAM. Reference [31] extended the applicability of the TAM to the context of mobile banking, by adding perceived credibility, perceived self-efficacy, and perceived financial cost to the model. Their findings strongly supported the extended TAM in predicting users' intentions to adopt mobile banking. Reference [32] presented an extended TAM to study the factors that determine user MC acceptance. Their findings indicated that all variables except perceived ease of use significantly affect users' behavioral intentions. Reference [33] studied the factors that determine user MC acceptance. The results supported the effect of perceived usefulness on the adoption intention of MC. Reference [34] integrated TAM and Innovation Diffusion Theory to study the factors that determine user acceptance of mobile payment. They found that perceived ease of use and perceived usefulness significantly affected users' adoption intentions of mobile payment. Given the extensive validations in the literature, the flexibility of TAM makes it suitable for various technologies [35]. Hence, TAM is conceived as an extremely appropriate baseline model for this study. Thus, we have the following hypotheses:

H4. Perceived ease of use (PE) positively influences behavioral intention towards adopting mobile APP (IA).

H5. Perceived usefulness (PU) positively influences behavioral intention towards adopting mobile APP (IA).

Reference [36] further investigated the relative effects of extrinsic and intrinsic motivations on intention to use the computer in the workplace. They defined perceived usefulness as an extrinsic source of motivation and perceived enjoyment as an intrinsic source of motivation. Reference [37] found that the usage of information system is affected by both extrinsic motivation (perceived usefulness) and intrinsic motivation (perceived fun). Reference [38] studied the use of TAM in the WWW context and incorporated the intrinsic motivation (perceived playfulness) construct to predict attitude. Their results indicated that TAM-related hypotheses were all supported, moreover, both perceived ease of use and perceived playfulness have a stronger effect on attitude than perceived usefulness has in the WWW context. Reference [39] presented an extended TAM with considering perceived enjoyment into the original TAM to analyze factors influencing subscribers' usage of 3G mobile services in Taiwan. Their study indicated that all perceived usefulness, perceived ease of use and perceived enjoyment are positively related to attitude towards use. They also found that attitude is the most important factor on behavior intention for 3G services, followed by perceived enjoyment, perceived ease of use and perceived usefulness. The direct effect of perceived usefulness on intention is not significant, but its indirect effect through attitude on intention is significant. Thus, the following hypothesis is postulated:

H6. Perceived playfulness (PP) positively influences behavioral intention towards adopting mobile APP (IA).

III. RESEARCH METHOD

A. Experiment Design

The hypotheses were tested by laboratory experiments with four scenarios consisting of combinations of OF (free/discounted price) and RL (high/low). In the experiments, light foods of 7-ELEVEN chain stores is targeted as the promoted products, and two APPs from 7-ELEVEN chain store corporation (the 7-ELEVEN calorie diary APP, denoted by cAPP, and the 7-ELEVEN store APP, denoted by sAPP) are adopted as premiums for the promotion. The cAPP works as a calorie tracker to help the users to meet their dietary goals, and hence is regarded as highly related to light foods. The sAPP provides users the locations, events and products of stores, and is treated as lowly related to light foods.

The experiments were conducted at a university in Taiwan. Participants were randomly assigned to one of the four scenarios. For each scenario we created web pages whereby the corresponding premium promotion was presented to participants. The web pages showed a bundle consisting of the promoted light foods and an APP premium mentioned above. For scenario 1 (Free download × high RL), the web page stated "download the cApp free (original price US$0.99) when you buy any light food from 7-ELEVEN stores." For scenario 2 (discounted price download × high RL), the web page stated "download the cAPP with 50% off (original price US$0.99) when you buy any light food from 7-ELEVEN stores." For scenario 3 (free download × low RL), the web page stated "download the sApp with free (original price US$0.99) when you buy any light food from 7-ELEVEN stores." For the last scenario (discounted price download × low RL), the web page stated "download the sAPP with 50% off (original price US$0.99) when you buy any light food from 7-ELEVEN

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stores. Participators could directly access the web page for introducing the APP functions along with a usage video by clicking the linkage posted on the web pages of each scenario.

B. Questionnaire Design

Through a detailed review of the related literature on TAM and premium promotion [40], a 21-item questionnaire (Table I) was devised as a measurement scale for the research. The questionnaire adopted a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The questionnaire was then adopted in a pilot test for scenario 1 and scenario 3 involving 30 students from one university in Taiwan. A reliability analysis was performed on the data collected from the pilot study. The Cronbach's α for each construct in this study ranged from 0.844 to 0.977 surpassing the standard threshold value of 0.70 [41], thus revealing good reliability. In order to verify the effectiveness of AR manipulation within-subjects, a t-test was performed using relationship between APP and promoted product as measurement in the pilot test. The participants evaluated that the cAPP was more related to the light foods than the sAPP (cAPP-light foods relationship mean=6.2; sAPP-light foods relationship mean=2.9). The difference was statistically significant at p<0.01.

C. Subjects

Taiwan has a mobile phone penetration rate of 122.1 %, with 3G phone users accounting for 24% of all users, and rising fast [46]. Therefore, this study focused on Taiwanese consumers as research subjects. Approximately 70.8% of people in Taiwan have adopted mobile value-added services recently, and most of them (53.5%) are aged 21–30 years old [46]. Therefore, if this age group was selected for sampling, the result would be representative to a certain degree of the population. Most users in this age range are students of college or graduate school. Thus, under limited research resources, 200 undergraduate and graduate students in a university in Taiwan engaged in the experiments. All participants were required to have experiences of downloading one or more APPs from a mobile application store.

IV. DATA ANALYSIS, RESULTS AND DISCUSSION

Excluding missing and invalid answers included questions answered wrongly (for instance, where the respondent gave more than one answer to a question that expected only one answer), or left blank, 176 valid responses were collected. The valid response rate was 88%. Among the 176 valid responses, 79 respondents were males (44.9 %) and 97 were females (55.1 %). In terms of educational background, graduate students accounted for 51.1 %, and all the other subjects were undergraduates. In terms of experience of APP use, 50.1% downloaded APPs for more than 10 times.

TABLE I
CONSTRUCTS AND QUESTIONS INCLUDED IN THE QUESTIONNAIRE

Construct	Item	Measurement	Ref.
Perceived Usefulness (PU)	PU1	Using this APP would enable me to control weight more effectively	[27, 42]
	PU2	Using this APP would make it easier to control my weight	
	PU3	Using this APP would improve the performance of weight- control goal	
	PU4	Using this APP would make it easier to control weight	
	PU5	I would find this APP useful in weight control.	
Perceived Ease of Use (PE)	PE1	Learning to use this APP would be easy for me	[27, 42]
	PE2	I would find this APP easy to use	
	PE3	My interaction with this APP would be clear and understandable	
	PE4	It would be easy for me to become skillful at using this application	
Perceived Playfulness (PP)	PP1	Using the APP gives enjoyment to me for weight control	[38]
	PP2	Using this APP gives fun to me for control weight	
	PP3	Using this APP gives enjoyment to me for control weight	
	PP4	Using this APP stimulates my curiosity	
	PP5	Using this APP leads to my exploration	
	PP6	Using this APP arouses my imagination	
Behavioral Intentions to Use APP (IA)	IA1	I will download this APP in the future	[43]
	IA2	I should download this APP	
	IA3	I would like to use this APP on a regular basis in the future	
Purchase Intention of Promoted Product (IP)	IP1	If light foods were available in 7-Eleven stores, I would intend to buy it	[44, 45]
	IP2	While I am interested in losing or maintaining weight, I may choose light foods of 7-Eleven stores	
	IP3	While someone needs to control weight, I will recommend light foods of 7-Eleven stores	

Data analysis was performed using Partial Least Squares (PLS). PLS can provide not only the examinations of all paths in the proposed model (structure model), but also supplementary analyses with underlying items (measurement model). Unlike covariance based approaches, PLS requires minimal demands on measurement scales, sample size, and distributional assumptions [48]. Reference [47] further recommends "rule of 10" guideline for PLS users: at least 10 cases per measured variable for the larger of (1) the largest latent factor block, or (2) the dependent variable with the largest number of incoming causal arrows in the model. In this research model, the first condition yields a minimum sample size required of 60, which is well exceeded by given sample size of 176. We used Smart PLS version 2.0 for data analysis. Smart PLS is a software application for the design of structural equation models (SEM) on a graphical user interface (GUI). We conducted our analysis in two stages. First, we tested the measurement model to ensure that the constructs had sufficient psychometric validity and then we addressed the structural model in which the hypotheses were examined.

Measurement reliability was assessed using internal consistency scores, calculated by the composite reliability

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(CR) scores [48]. Internal consistencies of all variables are considered acceptable since they exceed 0.7, signifying acceptable reliability [41]. The CR for all constructs are greater than 0.90. In addition, all items exhibit high loadings on their respective constructs. Thus, all constructs in the model exhibit good internal consistency. Convergent and discriminate validity is supported when the PLS indicators: (1) load much higher on their hypothesized factor than on other factors (own-loadings are higher than cross-loadings), and (2) when the square root of each construct's average variance extracted (AVE) is larger than its correlations with other constructs [47]. By comparing inter-construct correlations and AVE, all constructs share more variance with their indicators than with other constructs since all AVEs are well above 0.50 [49]. Thus, it can be concluded that the construct validity of this research can fulfill the statistical quality criteria.

Fig. 1 presents the structural measurement model using the PLS algorithm. The number in the circles in Fig. 1 means R^2, which denotes to coefficient of determination. R^2 provides a measure of how well future outcomes are likely to be predicated by the model, the amount of variability of a given construct. The amount of variance in IA explained by the model was 0.557. The explained variance of IP is 0.148.

The structural model in PLS was assessed by examining the path coefficients, t-statistics and R^2 value [47]. R^2 is used to indicate the strength of the predictive model. To calculate the significance of the path coefficients, a bootstrapping procedure was carried out that yielded t values. Path coefficients with t values higher than 1.65 are significant at a 5% level. Fig. 1 represents the results of the hypotheses (H1 to H6) and the corresponding standard Beta coefficients. The proposed model shows 55.7% of the variance in IA was explained by customer perceived value. All path coefficients showed statistically significant ($p<0.05$ or $p<0.01$) except the relation of perceived ease of use on intention to use APP. First of all, the construct of OF (free/discounted price) contributed to IA with standard β= - 0.310 which can be considered as strong influence. APP-product relationship contributed to intention to use APP with standard β=0.176 by which the influence is also significant. Moreover, the interaction involving OF and RL was significant with standard β=0.129.
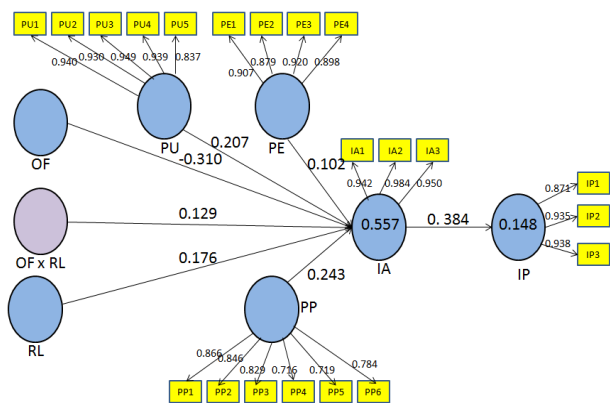

Fig. 1 The structural model: PLS results

Fig. 2 depicts the plot of OF×RL interaction means for IA measure. The results suggest free offering could appeal consumer to use the APP no matter how close the APP is related to the promoted product. Both PU and PP were dimensions which were strong in building intention to use APP as compared to PE (PU's β =0.207, PP's β = 0.243, and PE's β =0.102). Finally, IA positively influenced IP with β=0.384. The overall path coefficients of research model are depicted in Fig. 1.
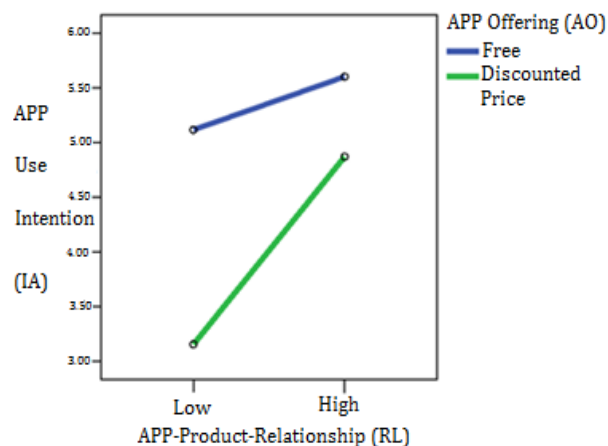

Fig. 2 The AO×RL interaction on IA

V. DISCUSSION

Results from the study support that OF, RL, PU, PP are consistently important factors in formulating intention to adopt an APP (IA) when it is offered with purchasing a specific product. In additions, empirical data from this study supports the effect of IA on intention to purchase the promoted product (IP). The following discussions of the research findings are divided into two sections. The first section discusses hypotheses (H1–H3) generated from core elements in the premium promotion, consisting of OF, RL, IA, and IP. The second section examines hypotheses (H4–H6) in the revised TAM, investigating the relationships between IA, PU, PP and PE.

Among all variable, OF has the most significant effect on IA. Fig. 1 indicates OF negatively related to IA; that is, the lower cost for earning the APP is, the more strong consumers' intentions towards adopting the APP is. The result concurs with the finding of Huang and Chang [20] that the free premium promotion is viewed by the consumer as a gain and will feel more valuable than self-liquidation premium promotion. Fig. 2 also presents the plot of the OF×RL interaction means for the IA measure. As the pattern of interaction means makes clear, the impact of RL on IA depended on the level of OF. When an APP incorporated in a promotional offer was free, the level of RL did not matter. However, in the case of APP offered at a discounted price, the relationship between APP and the promoted product had a positive impact on IA. As can be seen, the hypothesis H3 is supported which confirms the positive effect of IA on IP.

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Overall, the results suggest that promotional offers with free APPs were better appreciated by consumers. More importantly, the result shows that an APP is highly related to the promoted product and may compensated for it earned at a discounted price.

Empirical data in our experiments show that the relationships between PU, PP, and IA are consistent with previous TAM research. Although a video, demonstrating the using of APP, can be accessed from our experimental webpage, the relationship between PE and IA is not significant. As the finding of Yang [30] for MC, the lack of significance between PE and IA shows that PE might not be a good factor to predict mobile services that consumers do not have direct experience to use it. Another viewpoint is with the increasing trend of APP use, APPs are usually available with an intuitive and friendly interface which lead to ease of use as a threshold. PP is also found to be more useful than PU in predicting consumer's intention towards using an APP. The findings also concur with earlier TAM research, such as Moon and Kim [38], which consistently finds that PP is a more powerful predictor than PU. Moon and Kim [38] explained the differences in terms of predictability of PP and PU that PP had significant effects for both entertainment- purpose and work-purpose users, while perceived usefulness had a significant effect only for the work-purpose users. Based on the above findings, while it is not really surprising that entertainment-purpose users are motivated by playfulness, the fact that perceived playfulness also motivates the work-purpose users leaves clear implications for APP design.

VI. IMPLICATIONS

The mobile APP is becoming people's commodities in everyday life. Most people who have the smartphone such as iPhone or Android phone usually download and use the APPs with their hedonic and utilitarian benefits. Therefore, we investigated the effects of APPs as premiums in promotional offers, highlighting the premium-based and technology-based features of APP.

This study has contributed to the understanding of how consumers react to promotions with APPs as premiums. From a theoretical perspective, our proposed model provides several insights into the effects of digital premiums for sales promotions. Firstly, consumers will appreciate the APP-based promotion offer when they have a great interest in the APP premium. Our results indicate that, as the physical goods premium, the consumer's interest on digital premiums such as APPs could influence his/her intention to purchase the promotion offer. Moreover, the consumers' intentions towards the adoption of an APP are mostly affected by the cost for earning it. APPs are usually available either for free or at a price typically ranging from US$0.99-US$4.99 in APP stores. Our findings suggest the incentive for companies to offer a free APP premium for promoting products. However, if cost must be incurred for consumers to earn the APP, the features of APP, such as fit or complementary to the promoted product,

the perceived usefulness and the perceived playfulness, are critical for arising consumers' interest in the APP. The APP can facilitate the function or use of promoted product, which can enrich user utilitarian or hedonic benefits.

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